



Nebraska Department of Environmental Quality

For NDEQ USE ONLY

Permit Number _____
Reviewed By _____
Date Approved _____

CONSTRUCTION PERMIT APPLICATION FORM WASTEWATER WORKS

RECEIVED

MAR 30 2021

A. Owner's Name and Mailing Address:

For Municipalities/SIDs: Board Chairperson, Mayor, Utility Superintendent, or City Administrator
For Commercial or Industrial Facilities: Owner, Designated Company Officer
For Private Developments: Owner, Developer, or Association President

NE Dept of Environment and Energy
By: DEE158

Tanner Shaw, President	402-624-0900	402-624-2027
Name and Title	Phone	Fax
1344 County Road 10	Mead	NE 68041
Mailing Address	City	State Zip

B. Project Engineer Information:

Name of Project Engineer	Firm	Phone	Fax	Email
Mailing Address		City	State	Zip

C. Project Information: Water Filtration System

Project Name					Project Number	
Legal Description:	N	SW 12	14 N	8 E	Saunders	40.197222 N 96.480833 W
	1/4	1/4	Sect.	Town.	Range County	Latitude Longitude

D. Project Types: (Check all that apply)

- | | |
|--|---|
| <input type="checkbox"/> Gravity Sewer System | <input checked="" type="checkbox"/> New WWTF |
| <input type="checkbox"/> Lift Station and Force Main | <input type="checkbox"/> Modification to WWTF |
| <input type="checkbox"/> Other Collection System | <input type="checkbox"/> Industrial Pretreatment Facility |

E. For Sanitary Sewer Extensions: Name of Receiving WWTF _____

F. Engineering Statement for Sanitary Sewers: Check box if not applicable ☐

I have reviewed the available design data, flow records, and compliance history of the receiving WWTF. In my professional judgment, the WWTF has the hydraulic and treatment capacity to receive the additional wastewater from this sewer addition and remain in compliance with applicable Department regulations. (If unable to sign statement, attach explanation).

Project Engineer's Signature _____

Date _____



9502001202

Stoll, Hillary

From: Stoll, Hillary
Sent: Tuesday, March 30, 2021 2:14 PM
To: Scott Tingelhoff
Cc: Pracheil, Brad; Mary Tingelhoff; Matt O'Brien; Chew, Chin; Goans, Steve; Ugai, Susan
Subject: RE: AltEn Construction & NPDES Permit Application

Follow Up Flag: Follow up
Flag Status: Flagged

Scott,

I just gave your office a call. Feel free to give me a call if you have any additional questions. I did give the submission a quick look, but it will need to be prepared by a P.E registered in the State of Nebraska. Moreover, detailed design criteria will need to be included. The SOP submitted includes information about operation, but does not include detailed specifications. The plans and specifications should meet the requirements of Chapter 8. Chapter 7 further details the required documents. Please let me know if you have any additional questions.

Best,

Hillary Stoll
Environmental Engineer
Permitting & Engineering Division
Nebraska Department of Environment and Energy
P.O. Box 98922
Lincoln, NE 68509-8922
Direct: 402-471-4252 | Main Office: 402-471-2186
Hillary.Stoll@nebraska.gov | <http://dee.ne.gov>

From: Scott Tingelhoff <stingelhoff@mrgkc.com>
Sent: Tuesday, March 30, 2021 1:50 PM
To: Stoll, Hillary <Hillary.Stoll@nebraska.gov>
Cc: Pracheil, Brad <brad.pracheil@nebraska.gov>; Mary Tingelhoff <MTingelhoff@mrgkc.com>; Matt O'Brien <mobrien@mrgkc.com>; Chew, Chin <Chin.Chew@nebraska.gov>; Goans, Steve <steve.goans@nebraska.gov>; Ugai, Susan <susan.ugai@nebraska.gov>
Subject: Re: AltEn Construction & NPDES Permit Application

Hillary,

I apologize but I was under the impression that you would be able to do a quick review to see if you generally had what you needed or if you had some simple issues that needed corrected. If this is not the case, I apologize for submitting the incomplete application.

Scott Tingelhoff
Sent from my iPhone

On Mar 30, 2021, at 1:24 PM, Stoll, Hillary <Hillary.Stoll@nebraska.gov> wrote:

Scott,

Thank you for your submission. Regarding the Title 123 permit application, we will not begin our review until we receive documents prepared by a professional engineer registered to practice in the State of Nebraska that are properly sealed, signed, and dated per Title 123, Chapter 7-002. Please see Title 123 – *Rules and Regulations for the Design, Operation, and Maintenance of Wastewater Works* for all other requirements. Please let us know if you have any additional questions.

Best,

Hillary Stoll
Environmental Engineer
Permitting & Engineering Division
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Direct: 402-471-4252 | Main Office: 402-471-2186
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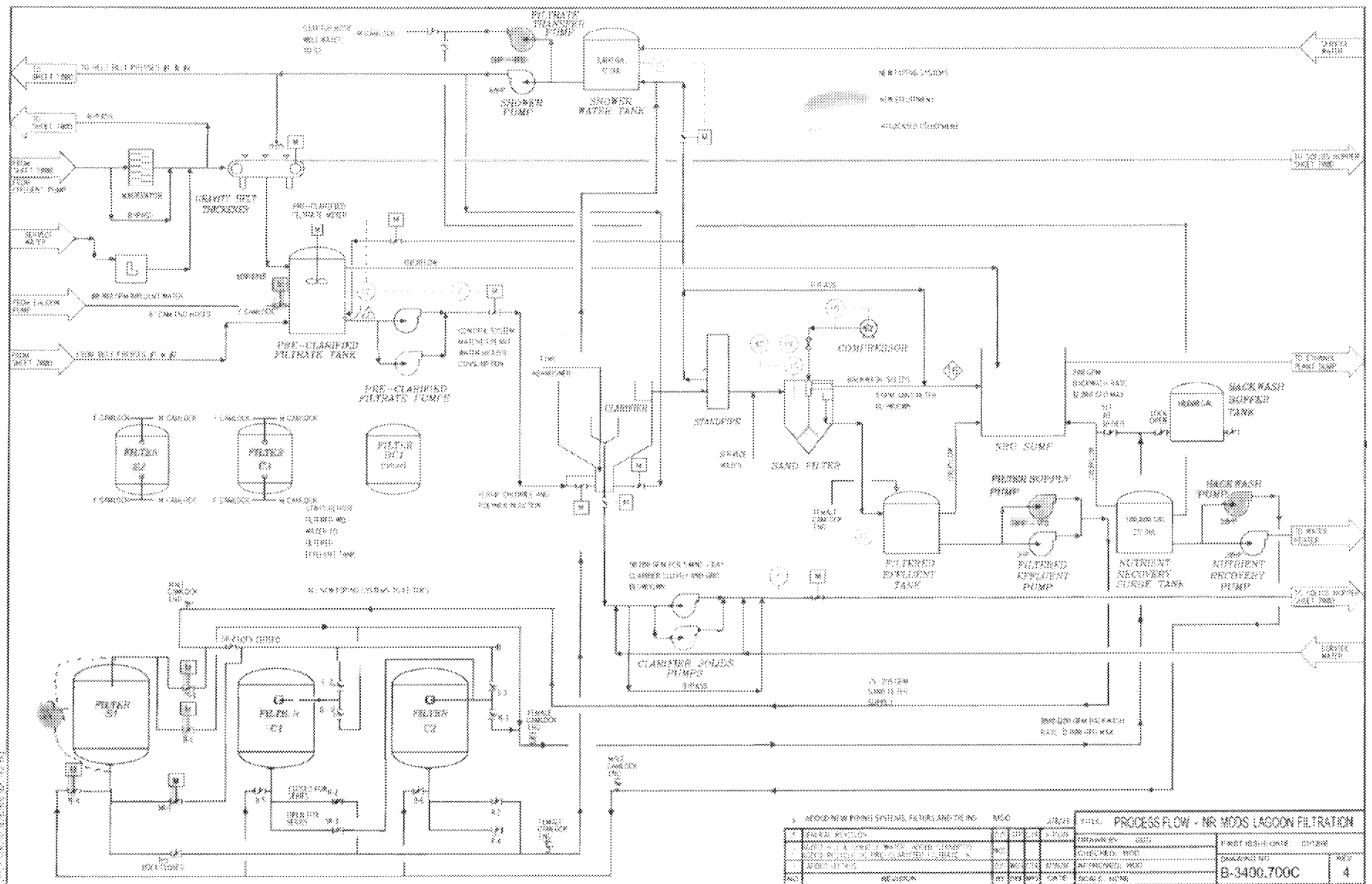
From: Scott Tingelhoff <stingelhoff@mrgkc.com>
Sent: Friday, March 26, 2021 3:29 PM
To: Ducey, Patrick <patrick.ducey@nebraska.gov>; Stoll, Hillary <Hillary.Stoll@nebraska.gov>
Cc: Pracheil, Brad <brad.pracheil@nebraska.gov>; Mary Tingelhoff <MTingelhoff@mrgkc.com>; Matt O'Brien <mobrien@mrgkc.com>; Anderson, Reuel <reuel.anderson@nebraska.gov>; Ewoldt, Cay <Cay.Ewoldt@nebraska.gov>; Ken Peterson <kpeterson@mrgkc.com>
Subject: AltEn Construction & NPDES Permit Application
Importance: High

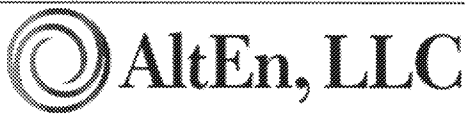
To All:

Please see the attached. If you have any questions, please let me know. If it meets your expectations I will obtain the engineering requirements. We truly appreciate your assistance with this.

Scott

Scott Tingelhoff
General Manager
AltEn, LLC
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Direct: (402) 624-0900
Fax: (402) 624-2027
stingelhoff@mrgkc.com





1344 County Road 10
Mead, NE 68041

SOP #: EP-05-4012

Title: Lagoon Water Filtration System - Standard
Operational Procedures (SOP)

Current Issue: 03/01/2021

Previous Issue:

Original Author: Matt O'Brien

Revised By:

1. PURPOSE:

This document provides methodology for the safe operation of the Lagoon Water Filtration System. Following this procedure will ensure the system operates as designed: to reuse lagoon water in the plant process water system, dilute the lagoons by filtration and return, or to transfer lagoon water when service, repairs or inspection is necessary.

Major parts of the new system include the lagoon transfer pump, level control valve, one multimedia sand filter, two new carbon filters, one sand filter booster pump, four automatic butterfly valves and the sand filter differential pressure sensor. Existing equipment in the nutrient recovery building is used as part of this new process. The purpose of this file is also to document tag numbers and define sequences of operation for initial startup, loading, normal operation and shutdowns.

2. SAFETY / NOTES:

- 2.1. All written safety procedures should be followed.
- 2.2. All valve operation should be done slowly and with complete understanding of effect
- 2.3. Review the SOP when conditions change
- 2.4. Review NR - AD SOP files for sampling

3. PERSONAL PROTECTIVE EQUIPMENT (PPE)

- 3.1. Standard PPE
 - 3.1.1. Safety Glasses
 - 3.1.2. Hardhat
 - 3.1.3. Gloves
 - 3.1.4. Steel Toe Footwear
- 3.2. Goggles when appropriate

4. MATERIALS AND EQUIPMENT:

- 4.1. Piping Systems Material of Construction
 - 4.1.1. All new piping systems are AISI 304L stainless steel
 - 4.1.2. Existing piping systems tied into, repurposed or reused as originally designed are CPVC
 - 4.1.3. Flexible hoses and fittings of various sizes from standard 5/8" garden to 4" camlock
 - 4.1.4. See Appendix I for all equipment descriptions and tags associated with this system
 - 4.1.5. See Piping and Instrumentation Diagrams B-3400.713 to B-3400.718 latest revisions.
 - 4.1.6. See Lagoon Water Filtration System Process Flow Diagram B-3400.700C Rev 4

5. PROCEDURE:

STARTUP AND OPERATION OF THE LAGOON DEWATERING AND FILTRATION SYSTEM

Filter System Preliminary Work

5.1. Fill the Sand Filter (SF-1) with media recommended by the supplier.

5.1.1. The sand filter, SF-1, contains 40,000 lbs of pea gravel and sand. This unit should not require periodic reloading. If the beds become blinded or fouled, follow the manufacturer's recommendation for unloading and reloading the media.

5.1.2. See TetraSolv Operation & Maintenance Manual: TetraSolv Filtration Liquid Filters for operation information on the TetraSolv filters.

5.2. Fill the Carbon Filters (CF-1, CF-2) with media recommended by the supplier.

5.2.1. The carbon filters, CF-1 and CF-2, each contain 20,000 lbs of Coconut Carbon. Coal and other carbon media may be utilized after the initial loading and operation of the system, depending on results and operation costs. The carbon filters will require periodic reloading.

5.3. Complete Initial and Periodic Backwash of the Sand Filter (SF-1) and Carbon Filters (CF-1, CF-2)

5.3.1. A key part of the correct startup for filter beds is an initial backwash after loading, this helps redistribute the media evenly and push fine particles to the top of the beds and/or out of the upper bed such that flow through the filters is even across the bed cross section.

5.3.2. The Startup backwash condition is when less than 10,000 gallons of water available in the Filtrate Surge Tank, T-1707, use the service well water shutoff valve, V-1459, the Shower Water Tank, T-1408, and the Filtrate Transfer Pump, P-1409, for backwashing the filters.

5.3.2.1.1. Route hose from the 4-inch camlock connection downstream of V-14104, to the 4-inch camlock backwash supply header connection, which also is a 4-inch camlock connection. Connect the hose using the camlock fittings available. Open the backwash supply header valve, BWSH-1. Close the backwash buffer tank inlet valve, V-17172, close the backwash buffer tank drain flow control valve, V-17173. Attach a 4-inch hose to the backwash return header valve, BWRH-1, set up a hose allowing observation of the backwash return.

5.3.2.1.2. Fill the shower water tank to 12 ft using the service well water valve, V-1459.

5.3.2.1.3. Close the supply and open the backwash valves for the filter to backwash.

5.3.2.1.3.1. For Sand Filter 1, SF-1, close valves S-1 and SR-1. Open valves B-1 and B-4. During normal operation and preparation for backwash the vents and drains for the filter being backwashed should be closed and the backwash header block valves for the other filters should be closed, check all valves.

5.3.2.1.3.2. For Carbon Filter 1, CF-1, close supply valve, S-2, and close return valve, R-2. Open backwash supply valve, B-5, and return valve, B-2.

5.3.2.1.3.3. For Carbon Filter 2, CF-2, close supply valve, S-3, and close return valve, R-3. Open backwash supply valve, B-6, and return valve, B-3.

5.3.2.1.4. At the discharge of the filtrate transfer pump, P-1409, close V-1488. Pump suction valves V-1478 and V-1486 should be open, confirm. Drain valves on the segment should be closed. Open V-14104, the water pressure head in the tank should begin to fill the line.

5.3.2.1.5. Start the filtrate transfer pump, P-1409.

5.3.4. After the system is operational. The carbon beds may need manually backwashed periodically when the differential pressure across the filter bed exceeds 2 psid from the original value. The carbon filter differential pressure indicators, CF1-DPI and CF2-DPI, measure the value for differential pressure and both have maximum differential pointer. When the filters are full of water with no flow, CF1-DPI and CF2-DPI will read the water height in the tank above the indicator. When flowing the indicator will begin showing a value lower than the maximum pointer. Do not move the maximum pointer, when the maximum pointer value minus the indicated value is -2 psid the filter should be backwashed. The differential pressure indicators include an adjustable electrical switch, which may be used to automatically backwash the carbon filters in a future expansion of the automation system.

Filtration System Loading and Operation

5.4. Test the electric heat trace tape for the Lagoon Transfer Pump (P-LTF1) and valves

- 5.4.1. Bench test the Heat Trace Temperature Controller, TC-LTP1.
- 5.4.2. Bypass TC-LTP1 and confirm the heat trace circuit performs properly for freeze protection
- 5.4.3. Depending on ambient temperature TC-LTP1 may not need bypassed to test heat trace

5.5. Starting the Lagoon Transfer Pump, P-LTF1.

- 5.5.1. Close the lagoon transfer pump discharge valve, LT-BV1.
- 5.5.2. Open the lagoon transfer pump recycle valves, LT-BV2 and LT-BV3.
- 5.5.3. Turn P-LTF1 start switch, SS-PLTF, to the on position to start the pump.
- 5.5.4. Close the lagoon transfer pump pressure indicator vent valve, LT-BV4.
- 5.5.5. Open the lagoon transfer pump pressure indicator block valve, LT-BV4.
- 5.5.6. Partially Open LT-BV4 to bleed air from the pressure indicator line.
- 5.5.7. When water is present a the vent line, Close LT-BV4.
- 5.5.8. Partially Open LT-BV1 and observe pump discharge pressure.
 - 5.5.8.1. With LT-BV-1 closed the pump discharge pressure should be 45 psig
 - 5.5.8.2. With LT-BV1 closed, And With LT-BV2 and LT-BV3 wide open the pump discharge should be around 15 psig and recirculation flow should 1000 gallons per minute.

5.6. Load Lagoon Transfer Line, Pump (P-LTF1) to Pre-Clarified Filtrate Tank (T-1301)

- 5.6.1. At T-1301, run a 2" camlock hose to the sump and open V-1326
- 5.6.2. At T-1301, open V-1360, attach 5/8" hose to fitting and route hose to sump
 - 5.6.2.1. *NOTE. [FUTURE EXPANSION] There is electrical wiring in place for a solenoid dump valve, which will be installed in the future and will automatically open when the LCV-1330 is closed for more than an adjustable timer (30 seconds minimum). This avoids excessive deadhead of the pump, avoids the need to continuously recirculate lagoon water through LT-BV2 and LT-BV3, and will prevent freezing when ambient temperatures are below 32 deg F.*
- 5.6.3. In the NR Building Control System select manual and set LCV-1330 position to 100%
- 5.6.4. At the Lagoon Transfer Pump, adjust Pump Discharge Valve, LT-BV1, to 40 deg open. With LT-BV3 wide open, adjust LT-BV2 such that pressure indicator reads in the 20-30 psig range. This will begin to slowly load the 4" flexible transfer hose that leads to the preclarifier level control valve, LCV-1330.
- 5.6.5. Walk the transfer hose line and observe the lay flat type hose filling. Move the hose as necessary to avoid kinking. Exercise caution in extreme cold weather conditions for any ice block or frost plugging. If any blockage is found close LT-BV1 and allow pump to

- 5.3.2.1.5.1. This can be done at the MMC bucket by selecting hand and using the HMI on the VFD. The drive will start at minimum or last speed, push the 'Up' button until 60 Hz is indicated.
- 5.3.2.1.5.2. Alternatively, at the MMC bucket select 'Remote'. This allows control from the ADNR or Plant HMI screen 'Sand Filter and Shower Water'. Select Manual On, put the VFD at maximum speed. Automatic Mode can also be used if the height in the shower water tank is above setpoint enough to drive the control loop to maximum output.
- 5.3.2.1.5.3. The service water supply valve to the shower water tank, V-1459, should nearly wide open to hold a steady level in the tank with P-1409 at full speed. Allow the flow path through CF-1 and to the backwash buffer tank for 15 minutes, or until the water is clear. Restrict the backwash supply valve, B-5 or slow down the speed drive if there is significant carbon loss to the drain. Dark color and fine particles are normal.
- 5.3.2.1.6. After backwash, turn off the backwash supply pump, P-1409. Close V-1459. Switch the backwash valves for the next filter as noted in SS 5.3.2.1.3.X above.
- 5.3.2.1.7. Restart P-1409 and open V-1459 to maintain a water level in the shower water tank at around 12 ft. Backwash each filter for 15 minutes, or less if the water runs clear. Turn off pump P-1409 at the ADNR HMI. After the pump slows and stops, place the selector switch in 'Remote' if not already in that mode.
- 5.3.2.1.8. Open the filtrate transfer block valve, V-1488. Close the filter backwash valves and open the filter supply valves. Close alternate backwash supply valves, V-14104 and BWRH-1. Put P-1409 in automatic and set the shower water level control loop, LIC-1411, at 8 feet.
- 5.3.2.1.9. Open the backwash buffer tank inlet valve, V-17172. Set the buffer tank drain valve, V-17173, at 30 degrees open with the locking handle and top plate.
- 5.3.3. Normal backwash. When more than 10,000 gallons is available in the Filtrate Surge Tank, T-1707, a normal backwash can be completed and the backwash supply pump, P-1709, is used. Close the backwash header return valve, BWRH-1, unless camlock hose is connected for backwash observation.
- 5.3.3.1. Confirm the buffer tank valve positions listed in SS 5.3.2.1.9. For basis of normal backwash conditions see the superficial velocity and bed expansion curve for the carbon media currently being used. The particle size distribution for the carbon filters was suggested by TetraSolv, at 12 to 30 mesh size. Based on the bed cross section and the mesh size, the recommend backwash rate is found at approximately 1,000 GPM. The backwash pump, P-1709, was specified to provide enough pressure but not drastic over range of the required backwash flow rate. This should ensure filter media will not push out during backwash; nonetheless, the backwash supply header valves can be restricted to achieve the desired flow rate, and the sump systems should always be monitored when backwashing the carbon filters.
- 5.3.3.2. Determine the estimated flow rate using the backwash pump curve, the target discharge pressure corresponding to 1,000 GPM is 15 psig at the pump discharge pressure indicator, BWSH-PI1. Adjust the carbon filter backwash supply valves, B-5 or B-6, as necessary for the target backwash rate and corresponding bed expansion.

recirculate back to the source lagoon. Deice as necessary and continue with loading the transfer line when flow obstruction is cleared.

5.6.6. When Lagoon Water flow is observed from the 5/8" hose to the sump, Close V-1360

5.6.7. When LIC-1313 begins to register level, put LCV-1330/LIC-1313 in automatic mode. Enter 3 ft as setpoint for height in the Pre-Clarified Filtrate Tank, T-1301.

5.6.8. Observe LIC-1313 physical valve position using the indicator on actuator top works.

Increase the LIC-1313 setpoint in 1/2 ft increments, Observe the reaction of the valve as the setpoint is increased and tune the loop with P and I values if necessary.

5.6.8.1. This process may also be completed prior to lagoon water introduction to the system by using the camlock branch connection off the filtrate transfer pump (P-1409). Route 4" flexible hose from pump discharge to the connection at the Pre-Clarified Filtrate Tank Level Control Valve, LCV-1330. Close the filtrate transfer block valve, V-1488. Open the camlock branch block valve, V-14104. Use the service water valve, V-1459, to hold water in the shower water tank. Turn on the filtrate transfer pump, P-1409. Put the LCV-1330 and P-1409 in automatic. Manually adjust V-1459 to test the control of the level control valve and pump variable speed drive. In first testing of this loop the PID values were set, they will be adjusted in first transfer of lagoon water into the filtration system by the integrator.

5.6.9. When T-1301 level control valve, LCV-1330, response is adequate; i.e., no significant overshoot and reaction appears quick enough to respond correctly to load, move to loading the Clarifier, T-1301. At this time, the drain valve V-1326 can be adjusted to allow a minimum flow suitable for the lagoon transfer pump and line, around 50 gpm. This is only critical in extremely cold conditions as the lagoon transfer pump is two impeller trash pump which can run with no flow for short periods, without damage.

5.6.10. Remove the startup hose. Close the level control valve inlet drain valve, V-1360, partially remove the standard hose fitting to allow vent for draining of the hose. When the draining is complete, remove hose and store to avoid trip any trip hazard.

5.7. Loading and Operating the Clarifier (T-1310) and Sand Filter (SF-1403)

5.7.1. See P+ID B-3400.713 and B-3400.714 latest revisions

5.7.2. Confirm the flow path is open from Pre-Clarified Filtrate Tank (T-1301) through the Standpipe, Sand Filter, and Filtered Effluent Tank (T-1701) which is now the source for the filter system booster pumps suction (P-1702, P-1703).

5.7.2.1. Open all V-13XX series valves except the isolation valves for the Polymer System, V-1322, the Lime System, V-1350, and the Hydrochloric Acid System, V-1322. V-1322 isolates the acid system from the untagged line between the Clarifier and Standpipe.

5.7.2.2. Check that the HCl supply valve, V-1458 is closed. This isolates the HCl system from the line between the Clarifier and Standpipe.

5.7.2.3. Open the shower water tank Service Water Line to the provide initial shower water for the Clarifier Adjust valve as necessary to hold level at mid tank level, approximately 8 ft is adequate.

5.7.2.4. Confirm the solids automatic blowdown valves, FL-1321A AND FL-1321B, are closed. The solids line isolation valves can be left open, V-1345 and V-1346.

5.7.2.5. Confirm the clarifier solids line, 6"-CLS-P5, flow paths are blocked.

5.7.2.5.1. Close the gravity belt solids feed isolation valve, V-15101.

5.7.2.5.2. Close belt press 1 solids feed isolation valve, V-15125.

- 5.7.2.5.3. Close belt press 2 solids feed isolation valve, V-15127.
- 5.7.2.6. Close the clarifier supply line drain valves, V-1361
- 5.7.2.7. Open the clarifier supply line isolation valve, V-1356.
- 5.7.2.8. Open the clarifier 6" supply line isolation valve, V-1343.
- 5.7.2.9. Open the clarifier 12" supply line flow control valve, FV-1316.
- 5.7.2.10. Open the Sand Filter Isolation Valves V-1454 and V-1455
- 5.7.2.11. Open the Sand Filter Solids Blowdown Valve V-1496
- 5.7.2.12. Close the Sand Filter Bypass Valve V-1497
- 5.7.2.13. See P-ID B-3400.714R2. The Sand Filter Bypass Line, 8"-SFBYP-P5, is not normally used. Confirm the isolation valve for the bypass line, V-1497, is closed. This valve isolates flow back to the Pre-Clarifier tank, 8"-CLR-RECYCLE. The level valve on that line to the Pre-Clarifier tank is valve LV-1320. That valve should be set in manual at 0. The Tank isolation valve V-1329 should be closed. When segments of pipe are closed they should be drained and vented. Open the vent valve, V-1453. If the line was loaded with liquids use LV-1320 and V-1329 to allow the line to drain into the Pre-Clarifier tank. Leave LV-1320 in manual, and change to wide open. When drained, close V-1329 and close the vent valve, V-1453. This section and valves listed can be used to put the system into a recirculation mode, when lagoon water is not flowing into the Pre-Clarified Filtrate tank. This may also be used when the Sand Filter SF-1 is in backwash (*this will be determined in testing, there should be adequate volumes in the clarifier and other tanks to backwash the sand filter without recirculating*)
- 5.7.2.14. Close the Sand Filter Bypass to Shower Water Tank Valves, isolation valve V-1460, and Automatic Level Valve, LV-1412. In similar fashion to previous segment, if the line was loaded, drain and vent prior to isolation. Do not block any lines full of liquid, which may freeze or expand during warming and damage piping or valves.
- 5.7.2.15.
- 5.7.2.16. Start Pump-1302 and restrict the discharge to 50 deg Open
- 5.7.2.17. As water is observed at the drains, Close the drains in the order of the flow path
 - 5.7.2.17.1. Follow NRAD SOP (####) for obtaining samples, sample the lagoon water then Close V-1330. Run pH and Solids test on the Lagoon Water. Send the lagoon water for outside laboratory testing as baseline for the system performance on the commissioning and each additional outage/restart for the filtration system.
- 5.7.2.18. Close V-1351, V-1352, V-1338, V-1340, V-1341
- 5.7.2.19. Confirm V-1322, isolation valve from abandoned polymer system, is closed.
 - 5.7.2.19.1.
- 5.7.3. Set the FIC-1307 to Manual and Open FV-1307 by entering CV value (250, #)
- 5.7.4. Close all drains (V-1360, V-1326)
- 5.7.5. Open Vents where available to bleed air, and close once air is eliminated.
- 5.7.6. Put Flow Control Valve (FV-1307) in Manual and Set at 50%

Solids Handling

5.8. Clarifier (T-1310) Solids Handling and Shower Water Dilution of Solids Lines

- 5.8.1. Prepare the Shower Water Pump (P-1410) for startup.

- 5.8.1.1. Confirm the shower water tank Level Transmitter Isolation Valve, V-1477, is open. This valve should only be closed if the transmitter is being serviced or replaced.
- 5.8.1.2. The belt presses and polymer system are not part of this SOP as they are abandoned in place and not part of the filtration system operation; however, before starting shower water pump, confirm the Belt Pressure Shower Water Isolation Valves, V-16134 and V-16138, are closed.
- 5.8.1.3. Confirm the Belt Press Shower Water Pressure Switch Isolation Valve, V-16140, is closed.
- 5.8.1.4. Also note Polymer Blending Service Water Line, 1"-NPW-C2, should be blocked using the service water isolation valve, V-1201. Confirm Polymer Blending System Service Water Isolation Valve, V-16129, is closed. Similarly, the Gravity Belt Thickener Shower Water Line, 2"-GBTSHW-S10, should be blocked using the shower water isolation valve, V-1495.
- 5.8.1.5. Service water valves for abandoned systems should be closed, including the polymer blending systems isolation valves, V-1201 and V-16129. When and where possible always drain isolated lines and systems.
- 5.8.2. Eliminate grit and sludge from the Clarifier. At times when grit and sludge accumulate in the lower cone of the Clarifier, Shower Water can be used to help with transferring slurry to the Clarifier Solids Pumps, P-1401 and P-1402.
 - 5.8.2.1. Confirm Level in the Shower Water Tank, T-1408, is above 4 feet based on level transmitter, LT-1411. If not, introduce service well water using the water isolation valve, V-1459, and maintain a level in the tank of 4 to 16 feet. If level is higher over 16 feet, the drain valve, V-1474 can be used to lower the tank level. The shower water tank has an overflow, the tank will overflow at an indicated level of 18 feet. Use V-1459 to hold level carefully and avoid excessive water waste to the sump.
 - 5.8.2.2. Open the shower water tank Outlet Isolation Valve, V-1478. Briefly blow down any grit in the shower water pump and filtrate transfer pump suction line using the sample and drain valve, V-1479. If the water is clear close V-1479. If the water is not clear continue to drain using V-1479 until clear.
 - 5.8.2.3. Open the shower water pump Inlet Isolation Valve, V-1480. Open the shower water pump Drain Valve, V-1485. Drain as necessary until clear water is available. Open the shower water pump Pressure Indicator Isolation Valve, V-1483. Open the Pressure Indicator Bleed Valve, V-1484, bleed off any dirty water, close V-1490.
 - 5.8.2.4. Open the shower water pump Outlet Isolation Valve, V-1482. Open the pump discharge sample and drain valve, V-1492. Partially open the discharge line vent valve, V-1493, to bleed air from the line. Close V-1493 when water appears, if there is not adequate elevation head in the shower water tank to push out air, increase the level or bump P-1410 to eliminate any air pockets. Close V-1493 and V-1492.
- 5.8.3. At times when grit and sludge hinder operation of the Clarifier Solids Pumps, P-1401 and P-1402, Shower Water can be introduced into the line from Clarifier Solids valves and Solids Pump. Prepare the Clarifier Solids Line, 6"-CLS-P5, and Solids handling equipment.
 - 5.8.3.1. Attach camlock hose to the 6" male camlock fitting off of the solids line, at V-1499. Run 6" hose into the sump system.
 - 5.8.3.2. Open Valve-1499. Run solids pumps P-1401.
- 5.8.4.

5.8.5. Clear any loss of flow indicated by Solids Flow Meter Element and Transmitter, FE-1416 and FT-1416.

5.8.5.1. If there is no discharge pressure at the pump discharge for P-1401 suction is limited or non existing.

5.8.5.1.1. Open the second shower water flow valve, FL-1321B.

5.8.5.1.2. Open the solid pump suction line service water isolation valve, V-1461.

5.8.5.1.3. Once the blockage is cleared, Open clarifier solids blowdown valves and attempt to complete the solids blowdown from the clarifier. Observe the drain flow. If the flow is adequate and water reduce the service water flow gradually until it may be able to be shut off. Observe the solids drain hose exit and when solids appear minimal. Close

5.8.5.2. Set up the Clarifier for Normal Solids Removal

5.8.5.2.1. Follow the Claricone recommended operating conditions for the Clarifier.

5.8.5.2.2. Open the shower water line isolation valves, FL-1321A and FL-1321B

5.8.5.2.3. Start the shower water pump, P-1410

5.8.5.2.4. Set the flow loop, FIC-1416, for the solids line and observe the flow going to the drain from V-1466. Adjust FIC-1416 such that solids flow is about 10% of the preclarified filtrate flow, FIC-1307.

5.8.5.3. Based on solids testing, FV-1316 will be opened, closed, or manually driven to a position to achieve the best overall clarifier performance.

5.9. Begin Supplying the Filters (SF-1, CF-1, CF-2)

5.9.1. Open the flow path for series operation. Go to ADNR HMI Screen 'Effluent Filters'.

5.9.1.1. Open the sand filter supply automatic valve, S-1.

5.9.1.1.1. Click on valve, S-1. Select Manual, then select Open.

5.9.1.2. Open the sand filter series return to carbon filter supply header valve, SR-1.

5.9.1.2.1. Click on the SR-1. Select Manual, then select Open. Note the sand filter parallel return valve to main return header, SR-2, is locked closed. This valve isolates the main supply header between the sand and carbon filters and is only used in special situations out of the scope of this SOP.

5.9.1.3. Open the sand filter backwash supply automatic valve, B-4.

5.9.1.3.1. Click on valve, B-4. Select Manual, then select Open.

5.9.1.4. Open the sand filter backwash return automatic valve, B-1.

5.9.1.4.1. Click on valve, B-1. Select Manual, then select Open.

Note: There are manual override handwheels for the four automatic valves at the sand filter. For partially open positioning of the automatic valves on the sand filter, the ice cube relay that drives the actuator must be removed. The hand wheel can be turned to put the valve in the desired position, indicated on actuator. This would only be for special cases.

5.9.1.5. Set the Sand Filter valves in automatic to enable the automatic backwash of the sand filter by. Click on valves S-1, SR-1, B-1 and B-4. Select Automatic for each valve.

5.9.2. Open the sand filter upper impulse line isolation valve, V- XXX. Open the sand filter vent valve. Close the sand filter lower drain valve. Open the lower impulse line isolation valve

and close the impulse line drain valve. The lower drain connection directly on the sand filter should be closed, it's only used for offloading the media.

- 5.9.3. Purge, Bleed and Load the Sand Filter Differential Pressure Transmitter and the Carbon Filters differential pressure indicators. Using the impulse line isolation valves, vent valves and impulse line purge valves.
- 5.9.4. When the clarifier and the recirculating sand filter, SF-1403 are full and weirs are correctly overflowing, a level will begin to register in the filtered effluent tank. At this time everything upstream of the sand filter 1 is ready for operation. Start the filter supply pump, P-1703.
 - 5.9.4.1. On ADNRR HMI Screen 'xxxx' select P-1703 and select Auto. The setpoint for the level in this tank should be in the 4-8 feet range. P-1702 will remain off in normal operation. As the pump begins to feed the sand filter, allow air to vent from the sand filter air vent. When liquid reaches this vent, close the vent valve. Open the upper impulse line isolation valve and open the differential pressure transmitter purge valve.
- 5.9.5. Place the filtration unit in series by closing the carbon filter number 2
- 5.9.6. Purge and Bleed the lines to SF-1 differential pressure transmitter, DPT-1.
 - 5.9.6.1. Close the upper impulse line isolation valve on the differential pressure transmitter manifold, MV-DPT1. Open the differential pressure transmitter top impulse line dump valve, V-DPT1. Open the equalization valve on differential pressure transmitter manifold valve, MV-DPTE. MV-DPT1. MV-DPT2. MV-DPTV1. MV-DPTV2. Do not continuously bleed the upper impulse line from the sand filter through the manifold valve, as there may be solids large enough to block the manifold valve from seating. For the upper impulse line use V-DPT1 to bleed air or purge impulse line of solids.
- 5.9.7. Load the SF-1 differential pressure transmitter, DPT-1.
 - 5.9.7.1. Only after bleeding air from the impulse lines per previous section. Open the upper impulse line isolation valve, MV-DPT1. on the differential pressure transmitter manifold, MV-DPT1. Open the differential pressure transmitter top impulse line dump valve, V-DPT1. Open the equalization valve on differential pressure transmitter manifold valve, MV-DPTE. MV-DPT1. MV-DPT2. MV-DPTV1. MV-DPTV2. Do not continuously bleed the upper impulse line from the sand filter through the manifold valve, as there may be solids large enough to block the manifold valve from seating. For the upper impulse line use V-DPT1 to bleed air or purge impulse line of solids.
 - 5.9.7.2. At the CF-2 use the drain valve to determine when water has made it to the final filter. Route 4" camlock hose from the return header valve, RH-1, to the sump. Open RH-1 to allow air to continue to purge from filter bank and to watch for the first filtrate. When clear filtrate apparent in the hose.
 - 5.9.7.3. When filtrate begins to register as level in the shower water tank. Confirm the flow path from shower water to the surge tank is open. Start the filtrate transfer pump, P-1409. Observe the tank level and pump variable frequency drive, as filtrate accumulates in the shower water tank the transfer pump, P-1409, will send filtrate to the surge tank in proportion to the level in the tank. Adjust proportional band and integral band as necessary to maintain steady operation.

5.10. Begin Sending Filtrate to the Water Heaters

- 5.10.1. When the Nutrient Surge Tank/Filtrate Storage Tank has more than 20,000 gallons available there is available backwash water and enough excess to being feeding water heaters. The level in the tank corresponding to 20,000 gallons is roughly 5-1/2 feet.
- 5.10.2. Close the well water isolation valve [new tag], open the filtration system isolation valve [new tag].
- 5.10.3. Start the Water Heater Supply Pump, P-1710.
- 5.10.4. Observe the reaction of water heater level controller and valve, LIC-612, tune the level control loop by making incremental changes to the setpoint and watching valve response. Only if necessary for stability, restrict the transfer pump discharge isolation valve or filtrate water isolation valve [new tag]
- 5.10.5. Manually Set the Flow control from preclarifier to clarifier, FIC-1307, to the typical rate the plant water heaters consume 80 gpm.
- 5.10.6. Observe water level in the tanks with active level controls (T-1301 / LIC-1313,
 - 5.10.6.1. If the system is relatively balanced put FIC-1307 in automatic mode with flow adder of 10 gpm. This should allow increasing level in the nutrient recovery surge tank, T-1707, adequate for what may be a daily sand filter backwash. This tank is now also known as the Filtrate Surge Tank (T-1707).

5.11. Begin Automatic Operation of the System

- 5.11.1. The flow from the preclarifier to the clarifier, FIC-1307, is the control for overall filtration throughput, and the primary process variable being managed with this system. In normal operation the flow into water heater (T-612) is in the 70 to 140 gallons per minute range. In the new water filtration system program the values from (FIC-1307) the water meter is averaged, and is the value that is automatically entered for the setpoint. There is a box tagged as Flow Adder, for times the level in the nutrient surge tank is out of desired range or additional filtration capacity is to be used and drained to sump a value in gallons can be added to the automatic match of flow to water heaters. This allows Surge Tank level management to ensure adequate volumes for backwash and for other operations needs related to filling water heaters. In manual mode the direct flow rate desired can be entered. FE-1307 and FT-1307 are the measuring and transmitting devices. FV-1307 is the final control element, a digitally positioned control valve, overhead near the steps leading to the mezzanine.
- 5.11.2. The flow into the clarifier should be controlled, and the clarifier should be adjusted per the Parkson Filter suggested operation and information within the job book regarding capacities and suggested operating levels. Observe Level of the Filtrate Holding Tank
- 5.11.3. Place LIC-1704 in automatic mode. Set point is in feet, and should be 6-8ft in the filtered effluent tanks, T-1701. Observe the sand filter booster pump, P-1703, running to hold level in the tank and supplying the sand filter with clarified filtrate.
- 5.11.4. Open the filtrate transfer path to the surge tank
 - 5.11.4.1. Confirm the suction valves are open, V-1478 and V-1486. Open V-1488 and close V-14104. The V-159 also isolates the surge tank, it's outside overhead with no operator and is left open at all times.
- 5.11.5. When the carbon filtered effluent reaches the shower water tank and registers level above 4 ft. Place LIC-1411 in automatic mode, and put the setpoint at 4-ft. This will run P-1409 at the appropriate speed to transfer the completed filtered water into the Filtrate Surge tank.

- 5.11.6. When level begins to register in the Filtrate Surge tank, T-1707. The entire system has been loaded. When there are 20,000 gallons in T-1707 the sand filter can be backwashed, this only needs done with the sand filter differential pressure is above 15 psi, as measured by the differential pressure transmitter, SF-DPT1.
- 5.11.7. Monitor the speed drives and level controls as the system is operating, balance the system using the level setpoints. Adding level to the tank providing suction to the variable speed pumps, P-1409 and P-1703 will allow them to move more water smooth the control of the system.
- 5.11.8. If P-1703 is not keeping up with the flow to the clarifier. Reduce flow to the clarifier with FIC-1307. There should not be a need to run P-1702, it remains as backup and does not have speed control.

5.12. Automatic Backwash of Sand Filter 1 (SF-1)

- 5.12.1. The start of backwash is based on sand filter differential pressure transmitter, DPT-SF1,
 - 5.12.1.1. In normal operation the backwash buffer tank inlet block valve, V-17172 is open.
 - 5.12.1.2. In the backwash buffer tank bypass valve to sump, V-17173, is 30 degrees open.
This system is designed to avoid overloading the drain line to sump 8. When sump 8 is out of service, see section 5.16.2.
 - 5.12.1.3. When the pressure differential across the filter exceeds setpoint, 15 psig, the sequence will start as follows.
 - 5.12.1.4. The backwash valves BV-1 and BV-4 will open.
 - 5.12.1.5. The filters supply pumps(s), P-1703(P-1702) will shut off and automatic valves S-1 and SR-1 will close. When the system is manned and goes into backwash this sequence should be directly monitored by operators to ensure valve interlocks and timers work correctly. This can avoid contamination of carbon beds and/or damage to pump seals.
 - 5.12.1.6. The backwash pump will come on and run until the timer completes, this is adjustable on the Effluent Filters Page on the HMI. The value is in seconds the maximum design condition is 600 seconds. Before adjusting the value or completing fully manual backwash of any filters be sure there is adequate volume in the Nutrient Surge Tank, given the backwash pump will flow around 1,000 gallons per minute and the surge tank has approximately 3,600 gallons volume per inch height. The flow adder function on FIC-1307 is adjusted to add to or reduce holding volume in the Filtrate Surge tank, T-1707. The backwash supply pump is self-priming and dry run rated, but adequate volume is necessary when the water heaters are being fed, failed backwashes waste water and reduce the total filtration system uptime. During the backwash, the suction line to the water heater supply pump, P-1709, and the backwash pump, P-1710 is under high demand. Observe the level in the Filtrate Surge tank and perform visual checks on the pumps, P-1709 and P-1710.
 - 5.12.1.7. After the timed backwash has completed. The normal flow to the Sand Filter, SF-1, will be restarted. The sequence is reversed, flow through P-1703 starts and filter differential pressure will be checked. It should return to nearly the original zero point. If the pressure differential is above setpoint, and if there is available water in the filtrate holding tank a second backwash cycle will be completed.

5.12.2. Operation changes during service of the Industrial Lift, Sump-8.

- 5.12.2.1. There is adequate capacity in the buffer tank for the standard backwash but during times sump 8 is in service the backwash duration should be changed to 300 seconds or less.
- 5.12.2.2. Set a diaphragm pump near the backwash buffer tank. Run 2" hose from the buffer tank lower drain valve, V-17174, to the pump suction. Obtain a manlift and run 2" hose and fittings from the discharge of the pump to the influent line isolation valve, V-17175, which has a female camlock fitting. Tie this hose off to the existing structure nearby so it can be safely lowered when sump 8 is back in service and the backwash process is normal again.
- 5.12.2.3. The flow path to the influent tank should be open, as stillage will be running to the influent tank as bypass to sump 8 operation. If the plant is not running, confirm the flow path to the influent tank is open.

6. NORMAL SHUTDOWN

This section describes the procedure for the normal shutdown of the Lagoon Water Filtration System

6.1. Shut off Lagoon Water Transfer

- 6.1.1. Open the lagoon transfer pump recirculation valves, LTF-BV2 and LTF-BV2.
- 6.1.2. Close the lagoon transfer pump discharge valve, LTF-BV1.
- 6.1.3. Turn off the lagoon transfer pump, P-LTF1, with the on off switch, SS-PLTF. In cold weather operations, check that heat trace system is working.

6.2. Stop Flow to the Clarifier

- 6.2.1. Set the flow control loop, FIC-1307, to manual. Change the manual input to 0%. Change the Flow Adder valve to 0.
 - 6.2.1.1. In extremely cold weather, the sand filter and/or shower water bypass lines may need to be used to maintain a flow through all pipe segments.
- 6.2.2. See portions of procedures associated with the existing ADNR system for shutdown of Pre-Clarified Filtrate Tank, Clarifier and Sand Filter

6.3. Turn Level Control Loops to Manual Off

- 6.3.1. Set the LIC-1313/LCV-1330 to Manual, enter 0 for flow value. Change mode LIC-1313 to Off.
- 6.3.2. Set the

6.4. Disable the Backwash function

- 6.4.1. Put the backwash control system in the manual off mode

7. WINTERIZATION

7.1. The runs continuously but Winter Shutdown may be necessary

- 7.1.1. Put the backwash control system in the manual 'Off' mode.
- 7.1.2. If shutdown occurs during cold weather, follow Management's defined procedures at the time of shutdown to prevent freezing of pipes and equipment. This includes but are not limited to draining all isolable segments of piping with liquids that can freeze.
- 7.1.3. Disable Pumps. Set all automatic systems to mode 'Off'.
- 7.1.4. Drain all Tanks and Piping systems.
- 7.1.5. Isolate and Vent all drained segments and pump settings.
- 7.1.6. Open the bleed valve upstream of LCV-1330.
 - 7.1.6.1. When no pressure is observed disconnect the hose and allow lagoon water to run into the NR building sump, only.

8. MANAGEMENT OF CHANGE: REVISION HISTORY

<u>REVISION</u>	<u>DATE:</u>	<u>REVISED BY:</u>	<u>REVISIONS MADE:</u>
ORIGINAL	2/26/2021	Matt O'Brien	Submitted for approval

I. APPENDIX A: REFERENCED EQUIPMENT DESCRIPTIONS AND TAGS

See ADNR Process Piping & Instrumentation Diagrams Series B3400 and Drawing B-3400.700CR4

- i. Lagoon Transfer Pump (P-LTF1).
- ii. Pre-Clarified Filtrate Tank (T-1301)
 1. Tank Outlet Isolation Valve (V-1328)
 2. Shower Water Bypass Isolation Valve (V-1329)
 3. Belt Press Return Isolation Valves (V-1323,V-1324,V-1325)
 4. Tank Drain Valve (V-1326)
 5. Level Transmitter (LT-1313) and Controller (LIC-1313)
 6. Level Control Valve (LCV-1330)
 7. Level Control Valve Inlet Drain and Sample Valve (V-1360)
 8. Isolation Valves (V-1331, V-1334) for Transfer Pumps (P-1302, P-1303)
 9. Piping (10"-SCCF-P5) from Pre-Clarified Filtrate Tank (T-1301) to Clarifier (T-1310)
 10. Other Drains and Vents on Drawing No. B-3400-714 latest revision
- iii. Solids Contact Clarifier (T-1310, Clarifier) and Sand Filter (SF-1403)
 1. Influent Flow Meter Element (FE-1307) and Transmitter (FT-1307)
 2. Influent Flow Controller (FIC-1307) and associated interlocks and control logic
 3. Influent Flow Control Valve (FV-1307)
 4. Influent Main Automatic Shutoff Valve (FV-1316) and Slide Gate Valve (V-1344)
 5. Influent Secondary Shutoff Valve (V-1343)
 6. Influent Line Drain Valves (V-1361, V-1362, V-1363)
 7. Effluent Flow Control Valve and Manual Shutoff Valve (V-1364)
 8. Effluent and Grit Line Drain Valve (V-1363)
 9. Effluent Line Drain Valve (V-1364)
 10. Solids Line (6"-CLS-PD) to Clarifier Solids Pumps (P-1401, P-1402)
 11. Shower Water Line 'A' Automatic and Manual Shutoff Valve (FL-1321A and V-1345)
 12. Shower Water Line 'B' Automatic and Manual Shutoff Valve (FL-1321B and V-1346)
 13. Effluent Shutoff Valve (V-1349) and Line (14"-CLE-P5) to Sand Filter (SF-1403)
 14. Sand Filter Inlet and Outlet Valves (V-1454, V-1455)
 15. Sand Filter Solids Block Valve (V-1496)
 16. Sand Filter Bypass Block Valve (V-1497)
 17. Line (8"-SFE-P5) to Filtered Effluent Tank (T-1701)
- iv. Clarifier Solids Line, Solids Pumps (P-1401, P-1402) and Solids Hopper (E-1501)
 1. Solids Line Isolation Valves
 2. Automatic Valves (FV-1314, V1348) Solids Line (6"-CLS-P5) and to Solids Pumps (P-1401, P-1402)
 3. Flow Meter Element (FE-1307) and Transmitter (FT-1307)
 4. Flow Controller (FIC-1307) and associated interlocks and control logic
 5. Flow Control Valve (FV-1307)
 6. Solids Hopper Line (6"-CLS-P5) and Solids Hopper Isolation Valve (V-15101)
 7. Belt Presses Feed Isolation Valves (V-15125 and V-15127)

v. Filtered Effluent Tank (T-1701)

1. Tank Outlet Isolation Valve (V-17144)
2. Line (6"-SFE-P5) to Sand Filter Booster Pumps and Multimedia Sand Filter (SF-1)
3. Filter Effluent Tank Pump #1 (P-1702). Now Filter Booster Pump Backup (P-1702)
4. Filter Booster Pump Primary (P-1703) and variable speed drive
5. Level Transmitter and Controller (LT-1704, LIC-1704)
6. Filter Booster Pumps Outlet Valves (V-17151, V-17157)
7. Line to Filter Supply Header (4" new stainless line tag TBD)

vi. Multimedia Sand Filter #1 (SF-1)

1. Isolation Valve (ABV-S1) from Supply Header (4"-FSH-S10)
2. Isolation Valve (ABV-SR1) to Supply Header (4"-FSH-S10)
3. Block Valve on Supply Header Between Sand and Carbon Filters (BV-SR2)
4. Isolation Valve (BV-R1) to Return Header (4"-FRH-10S)
5. Isolation Valve (ABV-B4) from Backwash Supply Header (6"-FBS-10S)
6. Isolation Valve (ABV-B1) to Backwash Return Header (6"-FBR-10S)
7. Sand Filter Supply Line Drain (BV-SD1)
8. Sand Filter Backwash Supply Line Drain (BV-BD1)
9. Upper Filter Impulse Line Isolation Valve (V-DPT1)
10. Lower Filter Impulse Line Block Valve (V-DPT2)
11. Differential Pressure Transmitter with 5 Valve Manifold (DPT-SF1)
12. Vent Valve (V-SFV1) and Vacuum Breaker (CV-SF1)
13. Lower Filter Drain Valve (V-SFD1)
14. Lower Filter Connection Root Valve (V-CGR1)
15. Lower Filter Sample Connection Isolation Valve (V-SFS1)

vii. Carbon Filter #1 (CF-1)

1. Isolation Valve (BV-S2) from Supply Header (4"-FSH-S10)
2. Isolation Valve (BV-R2) to Return Header (4"-FRH-10S)
3. Isolation Valve (BV-B5) from Backwash Supply Header (6"-FBS-10S)
4. Isolation Valve (BV-B2) to Backwash Return Header (6"-FBR-10S)
5. Upper Filter Impulse Line Isolation Valve (V-DPI1)
6. Lower Filter Impulse Line Block Valve (V-DPI1)
7. Differential Pressure Indicator with 3 Valve Manifold (DPI-CF1)
8. Vent Valve (V-CFV1) and Vacuum Breaker (CV-CF1)
9. Lower Filter Drain Valve (V-CFD1)
10. Lower Filter Connection Root Valve (V-CFR1)
11. Lower Filter Sample Connection Isolation Valve (V-CFS1)

viii. Carbon Filter #2 (CF-2)

1. Isolation Valve (BV-S3) from Supply Header (4"-FSH-S10)
2. Isolation Valve (BV-R3) to Return Header (4"-FRH-10S)
3. Isolation Valve (BV-B6) from Backwash Supply Header (6"-FBS-10S)
4. Isolation Valve (BV-B3) to Backwash Return Header (6"-FBR-10S)
5. Upper Filter Impulse Line Isolation Valve (V-DPI2)

6. Lower Filter Impulse Line Block Valve (V-DPI2)
7. Differential Pressure Indicator with 3 Valve Manifold (DPI-CF2)
8. Vent Valve (V-CFV2) and Vacuum Breaker (CV-CF2)
9. Lower Filter Drain Valve (V-CFD2)
10. Lower Filter Connection Root Valve (V-CFR2)
11. Lower Filter Sample Connection Isolation Valve (V-CFS2)
12. Filtrate Return Header (4"-FRH-10S) to the Shower Water Tank (T-1408)

ix. Shower Water Tank (T-1408)

1. Service Water Supply Valve (V-1459)
2. Tank Outlet Isolation Line (8"-SHW-P5) and Isolation Valve (V-1478)
3. Tank Drain Valve (V-1474)
4. Pump Supply Header Sample and Drain Valve (V-1479)
5. Shower Water Pump (P-1410) and Isolation Valves (V-1480,V-1481)
6. Filtrate Transfer Pump (P-1703) and Isolation Valves (V-1486,V-1487)
7. Level Transmitter Isolation Valve (V-1477)
8. Level Transmitter (LT-1411)
9. Level Controller (FIC-1411)
10. Line (4"-FTF-10S) to Nutrient Surge Tank (T-1707)
11. Belt Presses (BP-1601, BP-1602) Shower Water Line (4"-BPSHW-S10)
12. Belt Presses Shower Water Isolation Valve (V-1634)
13. Belt Press Shower Water Pressure Switch Isolation Valve (V-16140)
14. Gravity Belt Thickener (GBT Shower Water Line (2"-GBTSHW-S10)
- 15.

x. Nutrient Surge Tank (T-1408) now also known as Filtrate Holding Tank

1. Tank Outlet Isolation Valve (V-17161)
2. Level Transmitter (LT-1708) and Block Valve (V-17162)
 - a. Backwash Control Permissive to Start (LIC-1708)
3. Filtration Suction Line Drain and Sample Valve (V-17163)
4. Filtrate Transfer Pump (P-1710) and Isolation Valves (V-17173, V17174)
5. Filtrate Transfer Pump Drain Valve (V-17176)
6. Filtration Transfer Discharge Drain Valve and Alternate Filtrate Path (V-17171)
7. Backwash Supply Pump (P-1709) and Isolation Valve (V-17174)
8. Backwash Supply Pump Discharge Check Valve (P1709-CV1)
9. Overflow line to Sump (8"-NRFTOF-P5)

xi. Back Wash Buffer Tank (T-1770)

1. Tank Inlet Isolation Valve (V-17172)
2. Backwash Line Drain Flow Control Valve (V-17173)
3. Tank Outlet Isolation Valve (V-17174)
4. Influent Line Branch Block Valve (V-17175)
5. Back Wash Buffer Tank Vent Valve (V-17176)

xii. Abandoned Systems Isolation Valves

1. Service Water Isolation Valve (V-1201) for the Polymer Blending System (E-1202)
2. Service Water Isolation Valve (V-116129) for Polymer Blending System (E-1603,4,9)
3. Shower Water Isolation Valve (V-1495) for the Gravity Belt Thickener (GBT-1204)
4. Clarifier Solids Isolation Valve (V-15101) to the Solids Hopper Mixer (E-1501)
5. Clarifier Solids Isolation Valve (V-15125) to Belt Press 1 (BP-1601)
6. Clarifier Solids Isolation Valve (V-15127) to Belt Press 2 (BP-1602)
7. Clarifier Lime System Isolation Valve (V-1350)

II. APPENDIX B: MANUAL BACKWASH LOG SHEET

[illegible]

Analyzed By:

South Dakota Agricultural Laboratories
1335 Western Avenue
Brookings, South Dakota 57006
Phone: 605-692-7325
E-Mail: regina.wixon@sdaglabs.com

Collected By:

AITEn LLC-Mead-Ken Peterson
1344 County Rd 10
Mead, NE 68041
Phone: 605-354-0631
E-Mail: kpeterson@mrgkc.com

Report Date: 2021-03-22**Final Report**

Report Of Analysis

Date Received : 2021-03-09**Package Id : 20210309-002**

21PE001600**Description: Water (PO# 106015)****Date Collected: 2021-03-08**

030521 1400 F

Analyte	Result
Abamectin	12.0 ppb
Acetamprid	ND ppb
Acetochlor	ND ppb
Alachlor	ND ppb
Atrazine	ND ppb
Azoxystrobin	ND ppb
Brassinazole	ND ppb
Clothianidin	ND ppb
Cyproconazole	ND ppb
Desthio-Prothioconazole	ND ppb
Difenoconazole	ND ppb
Dimethenamid	ND ppb
Dimoxystrobin	ND ppb
Dinotefuron	ND ppb
Epoxiconazole	ND ppb
Fluconazole	ND ppb
Fluoxastrobin	ND ppb
Glufosinate	ND ppb
Glyphosate	ND ppb
Imidacloprid	ND ppb
Ipconazole	ND ppb
Isavuconazole	ND ppb
Metconazole	ND ppb
Metolachlor	ND ppb
Metribuzin	ND ppb
Nitenpyram	ND ppb
Orysastrobin	ND ppb
Pendimethalin	ND ppb
Picoxystrobin	ND ppb
Prometon	ND ppb
Propiconazole	ND ppb
Prothioconazole	ND ppb
Pyraclastrobin	ND ppb
Ravuconazole	ND ppb
Simazine	ND ppb
Sulfonic Acid Prothioconazole	ND ppb
Tebuconazole	ND ppb
Tetraconazole	ND ppb
Thiabendazole	8.99 ppb
Thiacloprid	ND ppb
Thiamethoxam	ND ppb
Trifloxystrobin	ND ppb
Uniconazole	ND ppb
Voriconazole	ND ppb

ND Not Detected

Reviewed By: Katie Ahlstrom.

The analytical results on this report reflect what was found in the laboratory sample as it was received at the laboratory.

Submitted by the customer:



20210309-002
21PE001600

Pesticide Residue Sample Submission Form

ISO/IEC 17025:2017 ACCREDITED

South Dakota Agricultural Laboratories
1335 Western Avenue
Brookings, SD, 57005
(605) 692-7325

20210309-002
21PE001600

PO # 106015

Please Rush!!

Name: ALTEN, LLC *Sample ID: 030521 1400 F

Address: 1344 County Rd 10 City: MCHD State: NE

Zip: 68041 Phone: (402) 624-0990 **Email: kpeterson@mgkc.com

*Sample ID must be marked clearly on the sample you submit. **Results will be emailed to the provided email address.

Billing information: ☒ Check box if billing is the same as customer information.

Name: _____ Address: _____

City: _____ State: _____ Zip: _____

Phone: (____) _____ Email: ALTEN Accounting@mgkc.com

Individual tests are \$150 each, unless otherwise marked. Scans are \$200 and include all of the compounds in a particular category. Acceptable samples include Vegetation or Soil. Call to confirm other substrates.

Thank you for choosing South Dakota Agricultural Labs! We do add analytes to our testing regiment throughout the year. If a chemical of interest is not listed, please call us:

(605) 692-7325.

How much sample should you send?

Please send 30g of vegetation or 100g of soil to run an individual test. What does this look like? For vegetation, it would be about a quart sized bag packed full. If more than one test is required, please fill a gallon sized bag. For soil samples, please send 2 cups, if more than one test is required send 4 cups. A \$12.00 sample prep fee is charged to all samples

Analyses offered

Please turn page over to view the current pesticide analyses.

If you are interested in a screen of active ingredients, please check the box next to the **bold-faced** heading. This will include all active ingredients within the PGR screen for \$212.

Example: PGR Screen ☒

If you are interested in single analyses, please circle the active ingredients. The cost of each individual analyte is \$150 unless otherwise marked.

Example: Mesotrione

Sample(s) Received at SD Ag Labs
Date 2021-03-09
Received by
Alyssa Kennedy

RUSH



WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Date of Issue: 05/21/2020

Version: 1.0

SECTION 1: Identification

1.1. Identification

Product form : Mixture

Product name : WEI 1728

ANTI-FOAM AGENT

1.2. Recommended use and restrictions on use

Use of the substance/mixture : Industrial Water Treatment

1.3. Supplier

Water Engineering
1574 County Road 10
P.O. Box PO Box 157
Mead, NE 68041
T 402-624-2286 - F 402-624-2287
office@h2oeng.com - www.h2oeng.com

1.4. Emergency telephone number

Emergency number : 800-255-3824

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

Acute toxicity (inhalation) Category 2 H330 Fatal if inhaled

Specific target organ toxicity (repeated exposure) Category 1 H372 Causes damage to organs through prolonged or repeated exposure

Full text of H statements : see section 16

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US) : Danger

Hazard statements (GHS US) : H330 - Fatal if inhaled
H372 - Causes damage to organs through prolonged or repeated exposure

Precautionary statements (GHS US) : P260 - Do not breathe dust/fume/gas/mist/vapours/spray.
P264 - Wash hands, forearms and face thoroughly after handling.
P270 - Do not eat, drink or smoke when using this product.
P271 - Use only outdoors or in a well-ventilated area.
P284 - [in case of inadequate ventilation] wear respiratory protection.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P310 - Immediately call a poison center or doctor.
P314 - Get medical advice/attention if you feel unwell.
P320 - Specific treatment is urgent (see supplemental first aid instruction on this label).
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P405 - Store locked up.
P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation.

2.3. Other hazards which do not result in classification

No additional information available

2.4. Unknown acute toxicity (GHS US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

3.2. Mixtures

Comments : The remaining components are non-hazardous and proprietary information.

This mixture does not contain any substances to be mentioned according to the criteria of section 3.2 of HazCom 2012

SECTION 4: First-aid measures

4.1. Description of first aid measures

- | | |
|---------------------------------------|--|
| First-aid measures after inhalation | : Remove person to fresh air and keep comfortable for breathing. |
| First-aid measures after skin contact | : Wash skin with plenty of water. |
| First-aid measures after eye contact | : Rinse eyes with water as a precaution. |
| First-aid measures after ingestion | : Call a poison center/doctor/physician if you feel unwell |

4.2. Most important symptoms and effects (acute and delayed)

- | | |
|---|---|
| Effects on humans | : Respiratory symptoms, lung damage. |
| Potential Adverse human health effects and symptoms | : Fatal if inhaled. Harmful if inhaled. |

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

- | | |
|--------------------------------|-------------------------------------|
| Suitable extinguishing media | : Dry powder, Foam, Carbon dioxide. |
| Unsuitable extinguishing media | : Water; risk of puddle expansion |

5.2. Specific hazards arising from the chemical

- | | |
|------------------|-----------------------------------|
| Explosion hazard | : Heating may cause an explosion. |
|------------------|-----------------------------------|

5.3. Special protective equipment and precautions for fire-fighters

- | | |
|--------------------------------|--|
| Protection during firefighting | : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing. |
|--------------------------------|--|

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

6.1.1. For non-emergency personnel

- | | |
|----------------------|----------------------------|
| Emergency procedures | : Ventilate spillage area. |
|----------------------|----------------------------|

6.1.2. For emergency responders

- | | |
|----------------------|---|
| Protective equipment | : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection". |
|----------------------|---|

6.2. Environmental precautions

Avoid release to the environment.

6.3. Methods and material for containment and cleaning up

- | | |
|-------------------------|---|
| Methods for cleaning up | : Take up liquid spill into absorbent material. |
| Other information | : Dispose of materials or solid residues at an authorized site. |

6.4. Reference to other sections

For further information refer to section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- | | |
|-------------------------------|---|
| Precautions for safe handling | : Ensure good ventilation of the work station. Wear personal protective equipment. |
| Hygiene measures | : Do not eat, drink or smoke when using this product. Always wash hands after handling the product. |

7.2. Conditions for safe storage, including any incompatibilities

- | | |
|--------------------|--|
| Storage conditions | : Store in a well-ventilated place. Keep cool. |
|--------------------|--|

WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

WEI 1728

No additional information available

8.2. Appropriate engineering controls

- Appropriate engineering controls : Ensure good ventilation of the work station.
- Environmental exposure controls : Avoid release to the environment.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

Protective gloves

Eye protection:

Safety glasses

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

In case of insufficient ventilation, wear suitable respiratory equipment

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

- Physical state : Liquid
- Color : amber
- Odor : mild
- Odor threshold : No data available
- pH : 5.5 - 7.5
- Melting point : -36 °C Not applicable
- Freezing point : No data available
- Boiling point : > 200 °F
- Flash point : 199 °C
- Relative evaporation rate (butyl acetate=1) : No data available
- Flammability (solid, gas) : Not applicable
- Vapor pressure : < 0.01
- Relative vapor density at 20 °C : No data available
- Relative density : 1.057
- Solubility : No data available
- Log Pow : No data available
- Auto-ignition temperature : No data available
- Decomposition temperature : No data available
- Viscosity, kinematic : No data available
- Viscosity, dynamic : No data available
- Explosion limits : No data available
- Explosive properties : No data available
- Oxidizing properties : No data available

9.2. Other information

No additional information available

WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 56 / Monday, March 26, 2012 / Rules and Regulations

SECTION 10: Stability and reactivity

10.1. Reactivity

The product is non-reactive under normal conditions of use, storage and transport.

10.2. Chemical stability

Stable under normal conditions

10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

10.4. Conditions to avoid

None under recommended storage and handling conditions (see section 7).

10.5. Incompatible materials

No additional information available

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity (oral) : Not classified

Acute toxicity (dermal) : Not classified

Acute toxicity (inhalation) : Fatal if inhaled

ATE US (gases)	100 ppmV/4h
ATE US (vapors)	0.5 mg/l/4h
ATE US (dust, mist)	0.05 mg/l/4h

Skin corrosion/irritation : Not classified

pH: 5.5 - 7.5

Serious eye damage/irritation : Not classified

pH: 5.5 - 7.5

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

STOT-single exposure : Not classified

STOT-repeated exposure : Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard : Not classified

Viscosity, kinematic : No data available

Effects on humans : Respiratory symptoms, lung damage.

Potential Adverse human health effects and symptoms : Fatal if inhaled, Harmful if inhaled.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product is not considered harmful to aquatic organisms or to cause long-term adverse effects in the environment.

12.2. Persistence and degradability

No additional information available

12.3. Bioaccumulative potential

No additional information available

12.4. Mobility in soil

No additional information available

WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

SECTION 14: Transport information

Department of Transportation (DOT)

In accordance with DOT

Not applicable

Transportation of Dangerous Goods

Not applicable

Transport by sea

Not applicable

Air transport

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory

15.2. International regulations

CANADA

EU-Regulations

National regulations

No additional information available

15.3. US State regulations

California Proposition 65 : This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Full text of H-phrases:

H330	Fatal if inhaled
H372	Causes damage to organs through prolonged or repeated exposure

WEI 1728

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Hazard Rating	
Health	: 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given
Flammability	: 1 Slight Hazard - Materials that must be preheated before ignition will occur. Includes liquids, solids and semi solids having a flash point above 200 F. (Class IIIB)
Physical	: 0 Minimal Hazard - Materials that are normally stable, even under fire conditions, and will NOT react with water, polymerize, decompose, condense, or self-react. Non-Explosives.

SDS US (GHS HazCom 2012)

DISCLAIMER OF LIABILITY The information in this SDS was obtained from sources which we believe are reliable. However, the information is provided without any warranty, express or implied, regarding its correctness. The conditions or methods of handling, storage, use or disposal of the product are beyond our control and may be beyond our knowledge. For this and other reasons, we do not assume responsibility and expressly disclaim liability for loss, damage or expense arising out of or in any way connected with the handling, storage, use or disposal of the product. This SDS was prepared and is to be used only for this product. If the product is used as a component in another product, this SDS information may not be applicable.



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

1. PRODUCT AND COMPANY INFORMATION

Water Engineering Inc.
1574 County Rd 10
Mead, NE 68041

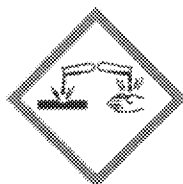
24 HOUR EMERGENCY TELEPHONE: (800) 255-3924
ACCOUNT NUMBER: MIS0004338
TO REQUEST AN MSDS: Contact Product Manager
CUSTOMER SERVICE: (800) 476-5545

MSDS NUMBER: 5501

PREPARED DATE: November 2015

2. HAZARDS CLASSIFICATION

OSHA REGULATORY STATUS: CORROSIVE
GHS CLASSIFICATION: 8



GHS SYMBOL:
GHS SIGNAL WORD: Danger!
GHS HAZARD STATEMENT: Data not available
EMERGENCY RESPONSE CODE: 154

EMERGENCY OVERVIEW:

COLOR: Red/Brown
PHYSICAL FORM: Liquid
ODOR: Not applicable
SIGNAL WORD: Danger!
MAJOR HEALTH HAZARDS: Irritant to skin and if inhaled to nose, throat and respiratory tract. May cause severe burns to eyes and if ingested to the mucous membranes of the mouth, throat, and digestive tract.
PHYSICAL HAZARDS: Data not available
ECOLOGICAL HAZARDS: Data not available
PRECAUTIONARY STATEMENTS: Data not available

POTENTIAL HEALTH EFFECTS:

INHALATION: Mists may cause irritation to nose, throat and respiratory tract, possible tissue damage
SKIN CONTACT: Irritant; prolonged contact may cause severe burns which may not be immediately painful or visible.
EYE CONTACT: May cause severe burns; possible permanent eye damage, even blindness.
INGESTION: Severe burns to mucous membranes of mouth, throat and digestive tract.

TARGET ORGANS: Not available
CHRONIC EFFECTS: None known in normal use

CARCINOGEN STATUS:

OSHA: No
NTP: No
IARC: No

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT: Iron Trichloride
CAS NUMBER: 7705-08-0
PERCENTAGE: 35-45%

COMPONENT: Hydrochloric Acid



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

CAS NUMBER: 7647-01-0

PERCENTAGE: 1-2%

The remaining components are non-hazardous, proprietary information

4. FIRST AID MEASURES

INHALATION: Remove to fresh air. Get medical attention if irritation persists or symptoms develop later.
SKIN CONTACT: Flush with water for at least 15 minutes while removing clothing. Continue to rinse until "slippery" feeling is gone. Get medical attention if irritation persists or burns develop.
EYE CONTACT: Immediately flush with copious amounts of water for 15 minutes. Hold eyelids open to ensure complete rinse. Remove contact lenses if worn. Get immediate medical attention.
INGESTION: DO NOT INDUCE VOMITING. Give water or milk to dilute. Never give anything by mouth to an unconscious person. Get immediate medical attention.

NOTE TO PHYSICIAN: Not available

5. FIRE FIGHTING HAZARDS

FIRE AND EXPLOSION HAZARDS: .
EXTINGUISHING MEDIA: Product will not burn
FIRE FIGHTING: Wear self-contained breathing apparatus if sulfur dioxide in air.
SENSITIVITY TO MECHANICAL IMPACT: Not available
SENSITIVITY TO STATIC DISCHARGE: Not available
FLASH POINT: None
HAZARDOUS COMBUSTION PRODUCTS: Not available

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Small Spills: Flush away with large amounts of water.
Large Spills: Dike to contain spill. Reclaim as much as possible. Absorb remainder with inert materials. Flush residue away with water. Prevent wash water from entering natural waterways or public water supplies.

7. HANDLING AND STORAGE

STORAGE: Keep from freezing. Store only in original container and keep closed while not in use. Do not contaminate food or feed by use or storage of this product.
HANDLING: Read label before using. Avoid skin and eye contact. Read and follow label instructions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS: Not available
BIOLOGICAL LIMIT VALUES: Not available
VENTILATION: Normally none required. Mechanical exhaust as needed if mist in air.
EYE PROTECTION: Splash proof goggles or chemical safety glasses. Provide full eye protection.
CLOTHING: Wear proper clothing to minimize skin contact. Launder contaminated clothing before reuse. Do not wear clothing soaked with product.
GLOVES: Rubber or plastic
PROTECTIVE MATERIAL TYPES: Not available
RESPIRATOR: Use NIOSH approved dust or mist respirator if mist in air causes irritation or exceeds exposure limits.

9. PHYSICAL AND CHEMICAL PROPERTIES



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

PHYSICAL STATE:		VAPOR DENSITY:	Not available
COLOR:	Red/Brown	SPECIFIC GRAVITY (water=1.000):	1.43
PHYSICAL FORM:	Liquid	BULK DENSITY:	Not available
ODOR:	Not available	WATER SOLUBILITY:	Soluble
BOILING POINT:	220°F	pH:	<2.0
MELTING POINT:	Not available	VOLATILITY:	Not available
FLASH POINT:	None	ODOR THRESHOLD:	Not available
DECOMPOSITION POINT:	Not available	EVAPORATION RATE:	Not available
VAPOR PRESSURE:	Not available	COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not available

10. STABILITY AND REACTIVITY

REACTIVITY:	Stable
CONDITIONS TO AVOID:	None
INCOMPATIBILITIES:	Do not mix with strong oxidizers or acids, may generate sulfur dioxide. Avoid contact with aluminum, zinc, tin, or galvanized metals except in accordance with produce use instructions.
HAZARDOUS DECOMPOSITION:	Contact with acids may release sulfur dioxide. Heating to dryness, as in a fire, may release sulfur dioxide.
POLYMERIZATION:	Not available

11. TOXICOLOGICAL INFORMATION

Formula 5512,	
IRRITATION DATA:	Not available
TOXICITY DATA:	Not available
CARCINOGEN STATUS:	None listed under OSHA, IARC or NTP.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:	Not available
ALGAL TOXICITY:	Not available
FATE AND TRANSPORT:	Not available
BIODEGRADATION:	Not available
PERSISTENCE:	Not available
BIOCONCENTRATION:	Not available
OTHER ECOLOGICAL INFORMATION:	Not available

13. DISPOSAL CONSIDERATIONS

Trained and properly equipped personnel may dilute and neutralize very carefully with alkali and dispose of in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:	
PROPER SHIPPING NAME:	Ferric Chloride, Solution
ID NUMBER:	UN 2582
HAZARD CLASS OF DIVISION:	8
PACKING GROUP:	III
LABELING REQUIREMENTS:	

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:	
SHIPPING NAME:	Ferric Chloride, Solution
UN NUMBER:	UN 2582



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

CLASS: 8

PACKING GROUP/RISK GROUP: III

EMERGENCY RESPONSE CODE: 154

15. REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):

ACUTE: YES

CHRONIC: NO

FIRE: NO

REACTIVE: NO

SUDDEN RELEASE: NO

SARA TITLE III SECTION 313 (40 CFR 372.65)

OSHA PROCESS SAFETY (29 CFR 1901.119):

OTHER U.S. REGULATIONS:

STATE REGULATIONS:

California Proposition 65:

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:

REPORTING REQUIREMENT:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

SPECIAL HEALTH HAZARD SUBSTANCE LIST:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

PENNSYLVANIA RIGHT TO KNOW:

REPORTING REQUIREMENT:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION:

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA):

TSCA 12(b) EXPORT NOTIFICATION:

CANADA INVENTORY (DSL/NDSL):

16. OTHER INFORMATION

NFPA RATINGS / HMIS RATINGS (SCALE 0-4): HEALTH= 3/3 FIRE= 0/0 REACTIVITY= 1/1

Disclaimer:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s)

The above information is not claiming characteristics of the product in term of legal claims of performance / guarantee. This information only describes safety measures and no liability may arise from the use or application of the product described herein. This information is given in good faith and based on our current knowledge of the product.



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

Ferric Chloride

REVISION DATE: August 2011

1. PRODUCT AND COMPANY INFORMATION

Water Engineering Inc.
1574 County Rd 10
Mead, NE 68041

24 HOUR EMERGENCY TELEPHONE: (800) 255-3924
ACCOUNT NUMBER: MIS0004338
TO REQUEST AN MSDS: Contact Product Manager
CUSTOMER SERVICE: (800) 476-5545

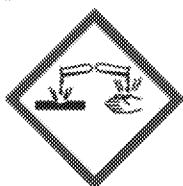
MSDS NUMBER: 5501

PREPARED DATE: November 2015

2. HAZARDS CLASSIFICATION

OSHA REGULATORY STATUS: CORROSIVE

GHS CLASSIFICATION: 8



GHS SYMBOL:

GHS SIGNAL WORD: Danger!

GHS HAZARD STATEMENT: Data not available

EMERGENCY RESPONSE CODE: 154

EMERGENCY OVERVIEW:

COLOR: Red/Brown

PHYSICAL FORM: Liquid

ODOR: Not applicable

SIGNAL WORD: Danger!

MAJOR HEALTH HAZARDS: Irritant to skin and if inhaled to nose, throat and respiratory tract. May cause severe burns to eyes and if ingested to the mucous membranes of the mouth, throat, and digestive tract.

PHYSICAL HAZARDS: Data not available

ECOLOGICAL HAZARDS: Data not available

PRECAUTIONARY STATEMENTS: Data not available

POTENTIAL HEALTH EFFECTS:

INHALATION: Mists may cause irritation to nose, throat and respiratory tract; possible tissue damage

SKIN CONTACT: Irritant; prolonged contact may cause severe burns which may not be immediately painful or visible.

EYE CONTACT: May cause severe burns; possible permanent eye damage, even blindness.

INGESTION: Severe burns to mucous membranes of mouth, throat and digestive tract.

TARGET ORGANS: Not available

CHRONIC EFFECTS: None known in normal use

CARCINOGEN STATUS:

OSHA: No

NTP: No

IARC: No

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENT: Iron Trichloride

CAS NUMBER: 7705-08-0

PERCENTAGE: 35-45%

COMPONENT: Hydrochloric Acid



SAFETY DATA SHEET

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PERCENTAGE: 1-2%

The remaining components are non-hazardous, proprietary information

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SKIN CONTACT: Flush with water for at least 15 minutes while removing clothing. Continue to rinse until "slippery" feeling is gone. Get medical attention if irritation persists or burns develop.
EYE CONTACT: Immediately flush with copious amounts of water for 15 minutes. Hold eyelids open to ensure complete rinse. Remove contact lenses if worn. Get immediate medical attention.
INGESTION: DO NOT INDUCE VOMITING. Give water or milk to dilute. Never give anything by mouth to an unconscious person. Get immediate medical attention.

NOTE TO PHYSICIAN: Not available

5. FIRE FIGHTING HAZARDS

FIRE AND EXPLOSION HAZARDS: .
EXTINGUISHING MEDIA: Product will not burn
FIRE FIGHTING: Wear self-contained breathing apparatus if sulfur dioxide in air.
SENSITIVITY TO MECHANICAL IMPACT: Not available
SENSITIVITY TO STATIC DISCHARGE: Not available
FLASH POINT: None
HAZARDOUS COMBUSTION PRODUCTS: Not available

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE:

Small Spills: Flush away with large amounts of water.
Large Spills: Dike to contain spill. Reclaim as much as possible. Absorb remainder with inert materials. Flush residue away with water. Prevent wash water from entering natural waterways or public water supplies.

7. HANDLING AND STORAGE

STORAGE: Keep from freezing. Store only in original container and keep closed while not in use. Do not contaminate food or feed by use or storage of this product.
HANDLING: Read label before using. Avoid skin and eye contact. Read and follow label instructions.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS: Not available
BIOLOGICAL LIMIT VALUES: Not available
VENTILATION: Normally none required. Mechanical exhaust as needed if mist in air.
EYE PROTECTION: Splash proof goggles or chemical safety glasses. Provide full eye protection.
CLOTHING: Wear proper clothing to minimize skin contact. Launder contaminated clothing before reuse. Do not wear clothing soaked with product.
GLOVES: Rubber or plastic
PROTECTIVE MATERIAL TYPES: Not available
RESPIRATOR: Use NIOSH approved dust or mist respirator if mist in air causes irritation or exceeds exposure limits.

9. PHYSICAL AND CHEMICAL PROPERTIES



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

PHYSICAL STATE:		VAPOR DENSITY:	Not available
COLOR:	Red/Brown	SPECIFIC GRAVITY (water=1.000):	1.43
PHYSICAL FORM:	Liquid	BULK DENSITY:	Not available
ODOR:	Not available	WATER SOLUBILITY:	Soluble
BOILING POINT:	220°F	pH:	<2.0
MELTING POINT:	Not available	VOLATILITY:	Not available
FLASH POINT:	None	ODOR THRESHOLD:	Not available
DECOMPOSITION POINT:	Not available	EVAPORATION RATE:	Not available
VAPOR PRESSURE:	Not available	COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not available

10. STABILITY AND REACTIVITY

REACTIVITY:	Stable
CONDITIONS TO AVOID:	None
INCOMPATIBILITIES:	Do not mix with strong oxidizers or acids, may generate sulfur dioxide. Avoid contact with aluminum, zinc, tin, or galvanized metals except in accordance with produce use instructions.
HAZARDOUS DECOMPOSITION:	Contact with acids may release sulfur dioxide. Heating to dryness, as in a fire, may release sulfur dioxide.
POLYMERIZATION:	Not available

11. TOXICOLOGICAL INFORMATION

Formula 5512,	
IRRITATION DATA:	Not available
TOXICITY DATA:	Not available
CARCINOGEN STATUS:	None listed under OSHA, IARC or NTP.

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA:	Not available
ALGAL TOXICITY:	Not available
FATE AND TRANSPORT:	Not available
BIODEGRADATION:	Not available
PERSISTENCE:	Not available
BIOCONCENTRATION:	Not available
OTHER ECOLOGICAL INFORMATION:	Not available

13. DISPOSAL CONSIDERATIONS

Trained and properly equipped personnel may dilute and neutralize very carefully with alkali and dispose of in accordance with Federal, State, and local regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:	
PROPER SHIPPING NAME:	Ferric Chloride, Solution
ID NUMBER:	UN 2582
HAZARD CLASS OF DIVISION:	8
PACKING GROUP:	III
LABELING REQUIREMENTS:	

CANADIAN TRANSPORTATION OF DANGEROUS GOODS:

SHIPPING NAME:	Ferric Chloride, Solution
UN NUMBER:	UN 2582



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

CLASS: 8

PACKING GROUP/RISK GROUP: III

EMERGENCY RESPONSE CODE: 154

15. REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4):

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30):

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21):

ACUTE: YES

CHRONIC: NO

FIRE: NO

REACTIVE: NO

SUDDEN RELEASE: NO

SARA TITLE III SECTION 313 (40 CFR 372.65)

OSHA PROCESS SAFETY (29 CFR 1901.119):

OTHER U.S. REGULATIONS:

STATE REGULATIONS:

California Proposition 65:

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW:

REPORTING REQUIREMENT:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

SPECIAL HEALTH HAZARD SUBSTANCE LIST:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

PENNSYLVANIA RIGHT TO KNOW:

REPORTING REQUIREMENT:

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

CANADIAN REGULATIONS:

WHMIS CLASSIFICATION:

NATIONAL INVENTORY STATUS:

U.S. INVENTORY (TSCA):

TSCA 12(b) EXPORT NOTIFICATION:

CANADA INVENTORY (DSL/NDL):

16. OTHER INFORMATION

NFPA RATINGS / HMIS RATINGS (SCALE 0-4): HEALTH= 3/3 FIRE= 0/0 REACTIVITY= 1/1 J

Disclaimer:

Although reasonable care has been taken in the preparation of this document, we extend no warranties and make no representations as to the accuracy or completeness of the information contained herein, and assume no responsibility regarding the



SAFETY DATA SHEET

Formula 5501

PRODUCT USE: Waste Water

REVISION DATE: August 2011

suitability of this information for the user's intended purposes or for the consequences of its use. Each individual should make a determination as to the suitability of the information for their particular purpose(s).

The above information is not claiming characteristics of the product in term of legal claims of performance / guarantee. This information only describes safety measures and no liability may arise from the use or application of the product described herein. This information is given in good faith and based on our current knowledge of the product.



SAFETY DATA SHEET

Formula 3640 FI

Polymer

PRODUCT USE: Wastewater Flocculant

REVISION DATE: February 15 2019

1. PRODUCT AND COMPANY INFORMATION

Water Engineering Inc.
1574 County Rd 10
Mead, NE 68041

24 HOUR EMERGENCY TELEPHONE: (800) 255-3924
ACCOUNT NUMBER: MIS0004338
TO REQUEST AN MSDS: Contact Product Manager
CUSTOMER SERVICE: (800) 476-5545

MSDS NUMBER: 3640 FI

PREPARED DATE: February 15 2019

Product Name: WEI Formula 3640 FI

Type of product: Mixture

2. HAZARDS CLASSIFICATION

OSHA REGULATORY STATUS: None
GHS CLASSIFICATION: None
GHS SYMBOL: None
GHS SIGNAL WORD: None
GHS HAZARD STATEMENT: None
EMERGENCY RESPONSE CODE:

EMERGENCY OVERVIEW:

COLOR: Milky
PHYSICAL FORM: Liquid
ODOR: Aliphatic

SIGNAL WORD:

MAJOR HEALTH HAZARDS: None
ECOLOGICAL HAZARDS: Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment

PRECAUTIONARY STATEMENTS: Spills produce extremely slippery surfaces

POTENTIAL HEALTH EFFECTS:

INHALATION: No Data Available
SKIN CONTACT: None
EYE CONTACT: Causes serious Eye irritation
INGESTION: Not toxic

TARGET ORGANS: Not applicable

CHRONIC EFFECTS: Not applicable

CARCINOGEN STATUS:

OSHA: None
NTP: None
IARC: None

See Section 11: TOXICOLOGICAL INFORMATION

3. COMPOSITION/INFORMATION ON INGREDIENTS

COMPONENTS:	CAS NUMBER:	PERCENTAGE:
Poly(oxy-1,2-ethanediyl), a-tridecyl-w-hydroxy-, branched	69011-36-5	< 5%
Distillates (petroleum), hydrotreated light	64742-47-8	20 - 30%



SAFETY DATA SHEET

Formula 3640 FI

PRODUCT USE: Wastewater Flocculant

REVISION DATE: February 15 2019

Remaining components are non-hazardous, proprietary information

4. FIRST AID MEASURES

INHALATION: Move to fresh air
SKIN CONTACT: Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. In case of persistent skin irritation, consult a physician.
EYE CONTACT: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Get medical attention immediately.
INGESTION: Rinse mouth with water. Do NOT induce vomiting. Call a physician or poison control center immediately.

NOTE TO PHYSICIANS: NONE

5. FIRE FIGHTING HAZARDS

EXTINGUISHING MEDIA: Any
FIRE FIGHTING: Wear self-contained breathing apparatus and protective suit.
SENSITIVITY TO MECHANICAL IMPACT: Not available
SENSITIVITY TO STATIC DISCHARGE: Not available
FLASH POINT: Not available
HAZARDOUS COMBUSTION PRODUCTS: Not available

6. ACCIDENTAL RELEASE MEASURES

OCCUPATIONAL RELEASE: Do not touch or walk through spilled material. Spills produce extremely slippery surfaces. Wear adequate personal protective equipment (see Section 8 Exposure Controls/Personal Protection). Do not flush with water. Dam up. Soak up with inert absorbent. Clean up by scoop or vacuum. Keep in suitable closed containers for disposal. After cleaning, flush away traces with water. Do not allow spills to contaminate surface water.

7. HANDLING AND STORAGE

STORAGE: Keep away from heat and sources of ignition. Freezing will affect the physical condition and may damage the material. Incompatible with oxidizing agents.
HANDLING: Avoid contact with skin and eyes. Renders surfaces extremely slippery when spilled. When using, do not eat, drink or smoke.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

EXPOSURE LIMITS: Distillates (petroleum), hydrotreated light
ACGIH: 200 mg/m³ (8 hours)
BIOLOGICAL LIMIT VALUES: Not available
VENTILATION: Ensure adequate ventilation, especially in confined areas. Use local exhaust if misting occurs. Natural ventilation is adequate in absence of mists.
EYE PROTECTION: Safety glasses with side-shields. Do not wear contact lenses.



SAFETY DATA SHEET

Formula 3640 FI

PRODUCT USE: Wastewater Flocculant

REVISION DATE: February 15 2019

CLOTHING: Wear coveralls and/or chemical apron and rubber footwear where physical contact can occur.

GLOVES: PVC or other plastic material gloves.

RESPIRATOR: Only needed if ventilation is insufficient

Other: Wash hands before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday. Handle in accordance with good industrial hygiene and safety practice.

9. PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL STATE:	Viscous Liquid	VAPOR DENSITY:	0.804 g/liter @ 20°C
COLOR:	Milky	SPECIFIC GRAVITY:	1.0-1.2
PHYSICAL FORM:	Liquid	BULK DENSITY:	1.0-1.2
ODOR:	Aliphatic	WATER SOLUBILITY:	Completely miscible
BOILING POINT:	> 100°C	pH:	3.5-6.5 @ 5 g/L
MELTING POINT:	< 5°C	VOLATILITY:	Not available
FLASH POINT:	Does not flash	ODOR THRESHOLD:	Not available
DECOMPOSITION POINT:	> 150°C	EVAPORATION RATE:	Not available
VAPOR PRESSURE:	2.3 kPa @ 20°C	COEFFICIENT OF WATER/OIL DISTRIBUTION:	Not available

10. STABILITY AND REACTIVITY

REACTIVITY: Stable under recommended storage conditions.

CONDITIONS TO AVOID: Contact with oxidizers, extreme temperatures

INCOMPATIBILITIES: Oxidizing agents may cause exothermic reactions.

HAZARDOUS DECOMPOSITION: Burning of dry material can produce hydrogen chloride gas, oxides of nitrogen, oxides of carbon.

POLYMERIZATION: Does not occur

11. TOXICOLOGICAL INFORMATION

IRRITATION DATA: May cause irritation

TOXICITY DATA: LD50 (rat) >5000 mg/kg (estimated)

CARCINOGEN STATUS: Not carcinogenic

12. ECOLOGICAL INFORMATION

ECOTOXICITY DATA: LC50/96 hrs > 10 mg/L

ALGAL TOXICITY: Not applicable due to flocculation behavior which invalidates testing

FATE AND TRANSPORT:

BIODEGRADATION:

PERSISTENCE: Readily biodegradable

BIOCONCENTRATION: Does not accumulate

OTHER ECOLOGICAL INFORMATION: Effects significantly mitigated by flocculation with suspended organic material

13. DISPOSAL CONSIDERATIONS

Waste from residues/unused products:
Dispose of in accordance with local and national regulations.

Contaminated packaging:
Rinse empty containers with water and use rinse water to prepare working solution. Container can be landfilled or incinerated if in compliance with regional regulations.



SAFETY DATA SHEET

Formula 3640 FI

PRODUCT USE: Wastewater Flocculant

REVISION DATE: February 15 2019

Recycling:

Store containers and offer for recycling of material when in accordance with the local regulations.

14. TRANSPORT INFORMATION

U.S. DOT 49 CFR 172.101:

PROPER SHIPPING NAME: Non-regulated Material

ID NUMBER:

HAZARD CLASS OF DIVISION

PACKING GROUP:

LABELING REQUIREMENTS:

CANADIAN TRANSPORTATION OF

DANGEROUS GOODS:

SHIPPING NAME:

UN NUMBER:

CLASS:

PACKING GROUP/RISK GROUP:

EMERGENCY RESPONSE CODE:

15. REGULATORY INFORMATION

U.S. REGULATIONS:

CERCLA SECTIONS 102a/103 HAZARDOUS SUBSTANCES (40 CFR 302.4): NONE

SARA TITLE III SECTION 302 EXTREMELY HAZARDOUS SUBSTANCES (40 CFR 355.30): NONE

SARA TITLE III SARA SECTIONS 311/312 HAZARDOUS CATEGORIES (40 CFR 370.21): NONE

ACUTE:	
CHRONIC:	
FIRE:	
REACTIVE:	
SUDDEN RELEASE:	

SARA TITLE III SECTION 313 (40 CFR 372.65): NONE

OSHA PROCESS SAFETY (29 CFR 1901.119): NONE

OTHER U.S. REGULATIONS: NONE

STATE REGULATIONS:

California Proposition 65: WARNING! This product contains a chemical known to the State of California to cause cancer and birth defects or other reproductive harm, Acrylamide

NEW JERSEY WORKER AND COMMUNITY RIGHT TO KNOW: NONE

REPORTING REQUIREMENT: NONE

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

SPECIAL HEALTH HAZARD SUBSTANCE LIST: NONE

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

PENNSYLVANIA RIGHT TO KNOW: NONE

REPORTING REQUIREMENT: NONE



SAFETY DATA SHEET

Formula 3640 FI

PRODUCT USE: Wastewater Flocculant

REVISION DATE: February 15 2019

(LIST CHEMICAL, CAS NUMBER, PERCENTAGE)

CANADIAN REGULATIONS: NONE

WHMIS CLASSIFICATION: NONE

NATIONAL INVENTORY STATUS: NONE

U.S. INVENTORY (TSCA): NONE

TSCA 12(b) EXPORT NOTIFICATION: NONE

CANADA INVENTORY (DSL/NDSL): NONE

16. OTHER INFORMATION

NFPA RATINGS/ HMIS RATINGS (SCALE 0-4):

HEALTH: 0

FIRE: 1

REACTIVITY: 0

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